

Upper Upper Miocene Fan 1 Play

UM3 F1, #1181

Cristellaria "K" and Robulus "E"/Bigenerina "A"

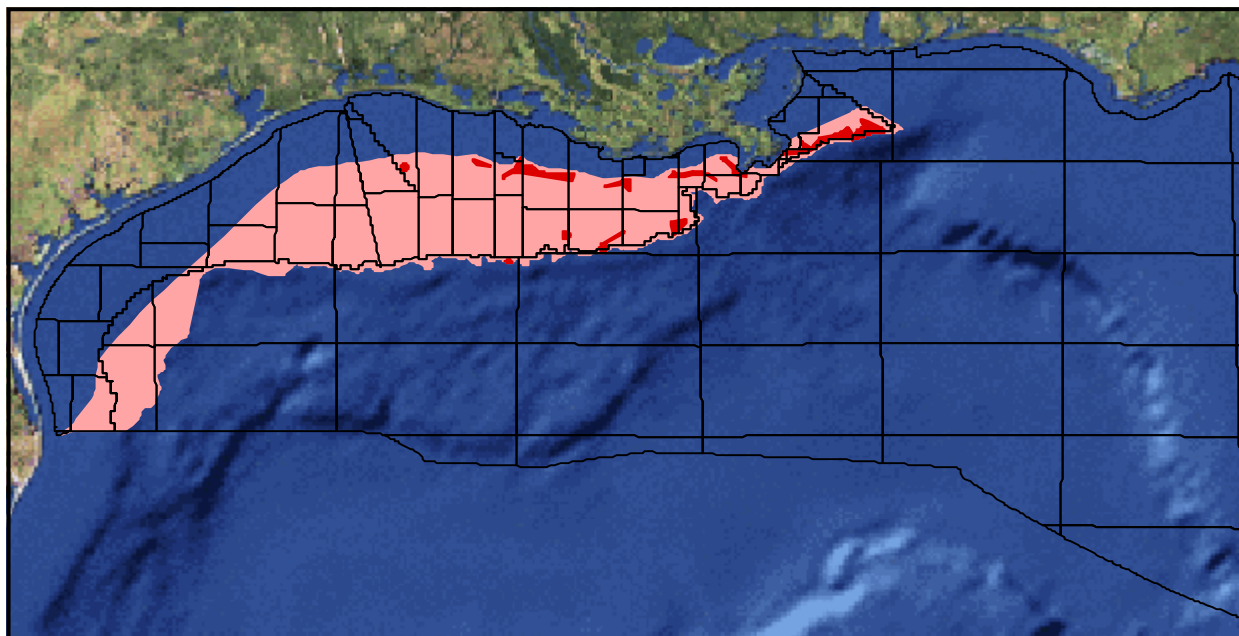


Figure 216. UM3 F1 map showing location of play. Play limit shown in light red; hydrocarbon limit shown in dark red.

Overview

The Upper Upper Miocene Fan 1 Play (UM3 F1) contains reserves of 1,002.409 Bcfg and 116.575 MMbo (294.940 MMBOE) in 82 sands in 29 fields. The play extends continuously from the South Padre Island to Destin Dome Area ([Figure 216](#)).

Description

UM3 F1 is defined by (1) a deep-sea fan depositional style representing sediments deposited basinward of the shelf edges associated with the UM3 Chronozone, (2) an extensional structural regime with salt-withdrawal basins and extensive listric, growth faulting rooting into salt detachments on the modern GOM shelf, and (3) the UM-2 and UM-3 Chronozones, the tops of which are defined by the *Cristellaria* "K" and *Robulus* "E"/*Bigenerina* "A" bio-zones, respectively ([Figure 8](#)).

UM3 F1 extends continuously from the South Padre Island Area offshore Texas, along and updip from the modern GOM shelf edge to the west-central Destin Dome Area east of the modern Mississippi River Delta ([Figure 216](#)). Hydrocarbons have

been found in discontinuous clusters from the West Cameron to Main Pass Area. In the offshore Louisiana area, there is a gap in hydrocarbon discoveries across the southern regions of the West Cameron through Grand Isle Areas. This gap represents an area where numerous, allochthonous salt bodies interrupt the deltaic sedimentary section and outlines an area of potential UM3 subsalt discoveries.

Little change in depositional systems from lower upper Miocene (UM1) time to UM3 occurred. The South Brazos Delta System (Morton et al., 1985) dominated deposition to offshore Texas, and the ancestral Mississippi River Delta System to offshore Louisiana. There are no hydrocarbon discoveries offshore Texas presumably because sediment influx to the offshore Texas area during UM3 time was minor because major depocenters were located offshore of southeastern Louisiana (Curtis, 1970).

No significant lateral shift occurs from UM1 deep-sea fan deposits to those of UM3 time. However, the shelf edge offshore Louisiana shows a basinward shift from UM1 to UM3 time, indicative of the prograding nature of the ancient delta system.

Play Limits

In an updip direction, the play is bounded by the UM-2 shelf edge, the farthest updip shelf edge associated with the UM3 Chronozone, and grades into the sediments of the Upper Upper Miocene Progradational Play (UM3 P1). To the northeast, UM3 F1 is limited by the deposits of the Upper Upper Miocene Aggradational/Progradational Play (UM3 AP1) overlying the lower Cretaceous carbonate shelf. To the southwest, UM3 F1 extends into Mexican national waters. Downdip, UM3 F1 is limited by the Upper Upper Miocene Fan 2 Play (UM3 F2).

Depositional Style

UM3 F1 is characterized by deep-sea fan systems deposited basinward of the UM-2 shelf edge. Component facies include channel/levee complexes, sheet-sand lobes, interlobe/fringe sediments, and slump sediments that were deposited on the UM-2 and UM-3 upper and lower slopes, in topographically low areas between salt structure highs, and abyssal plains. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

The UM3 deep-sea fan interval varies from less than 100 to more than 7,600 ft in thickness, with net sand thicknesses as much as approximately 1,200 ft.

Individual sands range from a few tens of feet to approximately 100 ft in thickness. Sand-dominated successions comprising deposits of multiple sheet-sand lobes can be more than 1,000 ft thick, with intervening shale sequences reaching as much as several thousands of feet in thickness. Thick, upward-coarsening and upward-fining log patterns of sand-dominated intervals represent sheet-sand lobe progradation and channel fill/abandonment, respectively, in proximal-fan areas. Irregularly stratified sand successions displaying spiky log patterns suggest deposition in distal-fan areas.

Structural Style

Many of the fields in UM3 F1 are structurally associated with salt diapirs—shallow, intermediate, and deep depths—with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Numerous fields are also associated with normal faults. Less common structures in the play include anticlines and growth fault anticlines.

Quantitative Attributes

On the basis of reserves calculations, UM3 F1 is 60% gas and 40% oil. The 82 sands in the play comprise 191 reservoirs, of which 81 are nonassociated gas, 98 are undersaturated oil, and 12 are saturated oil. Proved reserves are estimated at 867.359 Bcfg and 110.002 MMbo (264.336 MMBOE) in 77 sands in 27 fields ([Table 101](#)). Unproved reserves are estimated at 135.050 Bcfg and 6.573 MMbo (30.604 MMBOE) in 5 sands in 2 fields. These proved plus unproved reserves account for only 5% of the reserves for the UM3 Chronozone.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	77	110.002	867.359	264.336
Cum. production	71	89.060	674.249	209.033
Remaining proved	45	20.943	193.110	55.304
Unproved	5	6.573	135.050	30.604

Table 101. UM3 F1 reserves and cumulative production.

Cumulative production from UM3 F1 totals 674.249 Bcfg and 89.060 MMbo (209.033 MMBOE) from 71 sands in 25 fields. UM3 F1 production accounts for only 5% of the UM3 Chronozone's total production. Remaining proved reserves in the play are 193.110 Bcfg and 20.943 MMbo (55.304 MMBOE) in 45 sands in 22 fields.

[Table 102](#) summarizes that water depths of the fields in UM3 F1 range from 57–428 ft, and play interval discovery depths vary from 5,600–18,410 ft, subsea. Additionally, porosity and water saturation range from 16–35% and 16–56%, respectively.

82 Sands	Min	Mean	Max
Water depth (ft)	57	179	428
Subsea depth (ft)	5,600	12,157	18,410
Reservoirs per sand	1	2	22
Porosity	16%	26%	35%
Water saturation	16%	31%	56%

Table 102. UM3 F1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

UM3 F1 has a 37-year history of discoveries ([Figure 217](#)). The first sand in the play was discovered in 1962 in the South Marsh Island 23 Field. The maximum number of sands, 9, discovered in any year occurred in 1968 from two fields and in 1970 from one field. The maximum yearly reserves

of 79.882 MMBOE were also added in 1968. Sand discoveries per year appear bimodal with peaks in the late-1960's and late-1990's.

The largest sand in the play was discovered in 1968 in the Main Pass 306 Field and is estimated to contain 35.573 MMBOE (Figure 218). The mean sand size for the play is 3.597 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 18 sands have been discovered, the largest of which is estimated to contain 20.116 MMBOE.

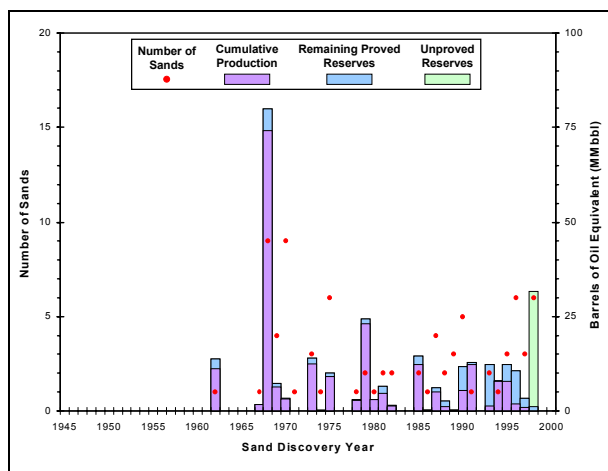


Figure 217. UM3 F1 exploration history graph showing reserves and number of sands discovered by year.

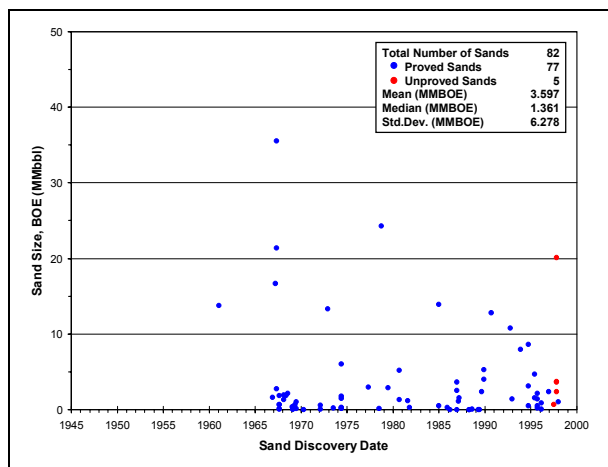


Figure 218. UM3 F1 sand discovery graph showing the size of sands discovered by year.

Production History

UM3 F1 has a 30-year history of production (Figure 219). Oil and gas production began in 1969. Oil production quickly increased to its peak yearly value in 1971. Since then, it has declined and fluctuated at less than half peak values. Gas production has been fairly erratic throughout the play's history. In the 1990's, gas production increased and reached its highest level ever in 1996.

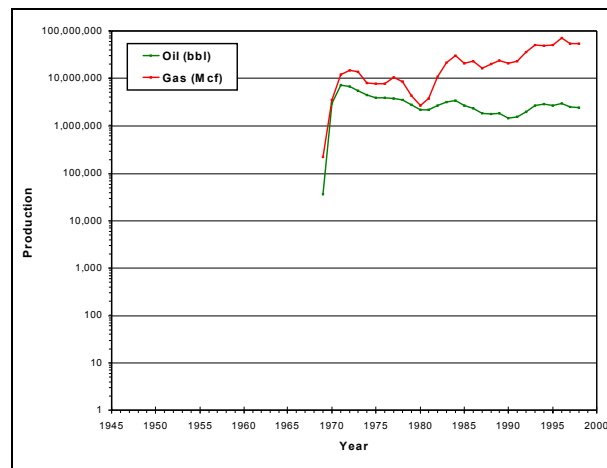


Figure 219. UM3 F1 production graph showing oil and gas production by year.